AMENDMENTS

In the Claims

Please amend the claims as indicated hereafter.

1. (Currently Amended) A method for forming an ohmic contact on a semiconductor layer comprising:

~~(a)~~ depositing a reactive layer comprising at least one electrically conductive material on at least a portion of a compound semiconductor layer, wherein the at least one electrically conductive material is chosen from nickel, ruthenium, vanadium, gold, and cobalt; and

~~(b)~~ depositing a refractory layer comprising ~~electrically conductive material~~ titanium on the reactive layer, wherein said refractory layer is substantially free of gold, and

wherein additional layers of conductive metal are not deposited on the refractory layer in the forming of the ohmic contact.

2. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer comprising electrically conductive material on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, InAs, $In_xGa_{1-x}P$, InP, $In_xAl_{1-x}As$, InGaAsP, GaSb, or $In_xGa_{1-x}Sb$, all wherein $0<x<1$.

3. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer comprising electrically conductive material on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein x is approximately $0.05<x<1.00$.

4. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer comprising electrically conductive material on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein x is approximately $0.3<x<0.8$.

5. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer comprising electrically conductive material on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein x is approximately 0.6.

6. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer comprising electrically conductive material on at least a portion of a compound semiconductor layer that comprises InAs.

7. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a thin reactive layer comprising platinum, indium, nickel, ruthenium, vanadium, gold, cobalt or mixtures or composites thereof.

8. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a thin reactive layer comprising nickel.

9. (Original) The method according to claim 2 wherein said step of depositing a reactive layer comprises depositing a thin reactive layer further comprising an adhesive element.

10. (Currently Amended) The method according to claim 4 wherein said step of depositing a reactive layer comprises depositing a thin reactive layer further comprising an adhesive element ~~selected from the group consisting~~ chosen from at least one of chromium, titanium, and silicon.

11. (Original) The method according to claim 4 wherein said step of depositing a reactive layer comprises depositing a thin reactive layer further comprising from about 5 to about 45 atomic percent of an adhesive element.

12. (Canceled)

13. (Canceled)

14. (Previously Amended) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer having a thickness in the range of from about 10 to about 500 angstroms.

15. (Previously Amended) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer having a thickness in the range of from about 20 to about 100 angstroms.

16. (Original) The method according to claim 1 wherein said step of depositing a reactive layer comprises depositing a reactive layer having a thickness of about 40 angstroms.

17. (Original) The method according to claim 1 wherein said step of depositing a refractory layer on the reactive layer comprises depositing a refractory layer having a thickness of at least about 100 angstroms.

18. (Original) The method according to claim 1 wherein said step of depositing a refractory layer on the reactive layer comprises depositing a refractory layer having a thickness of about 800 angstroms.

19. (Original) The method according to claim 1 wherein said step of depositing a reactive layer is performed using at least one of the following techniques: evaporation, reactive sputtering, nonreactive sputtering, chemical vapor deposition, electroplating and electroless plating.

20. (Original) The method according to claim 1 wherein said step of depositing a refractory layer is performed using at least one of the following techniques: evaporation, reactive sputtering, nonreactive sputtering, chemical vapor deposition, electroplating and electroless plating.

~~21~~. (Currently Amended) An ohmic contact to a compound semiconductor layer comprising:

~~(a)~~ a reactive layer comprising at least one electrically conductive material, wherein the at least one electrically conductive material is chosen from nickel, ruthenium, vanadium, gold, and cobalt~~,~~ ; ~~and~~

~~(b)~~ a refractory layer, wherein said refractory layer is substantially free of gold~~,~~ ; and

~~wherein additional layers of conductive metal on the refractory layer are not necessary in the ohmic contact~~

a low sheet resistance layer disposed upon the refractory layer.

22. (Previously Canceled)

23. (Original) The ohmic contact according to claim 21 wherein said reactive layer comprises nickel.

24. (Original) The ohmic contact according to claim 21 wherein said reactive layer further comprises an adhesive element.

25. (Currently Amended) The ohmic contact according to claim 21 wherein said adhesive element is ~~selected from the group consisting~~ chosen from at least one of chromium, titanium, and silicon.

26. (Currently Amended)The ohmic contact according to claim 21 wherein said reactive layer further comprises from about 5 to about 45 atomic percent of an adhesive element.

27. (Previously Amended) The ohmic contact according to claim 21 wherein said refractory layer comprises a material selected from the group consisting of: titanium, molybdenum, tungsten, TiW, metal nitrides, metal silicides and metal borides.

28. (Original) The ohmic according to claim 21 wherein said refractory layer comprises titanium.

29. (Previously Amended) The ohmic contact according to claim 1 wherein said reactive layer has a thickness in the range of from about 10 to about 500 angstroms.

30. (Previously Amended) The ohmic contact according to claim 1 wherein said reactive layer has a thickness in the range of from about 20 to about 100 angstroms.

31. (Original) The ohmic contact according to claim 21 wherein said reactive layer has a thickness of about 40 angstroms.

32. (Previously Amended) The ohmic contact according to claim 21 wherein said refractory layer has a thickness of about 100 angstroms.

33. (Original) The ohmic contact according to claim 21 wherein said refractory layer has a thickness of about 800 angstroms.

34. (Currently Amended) An ohmic contact to a compound semiconductor layer comprising:

~~(a)~~ a reactive layer, said reactive layer is nickel; and

~~(b)~~ a refractory layer, said refractory layer is titanium,

wherein said refractory layer is substantially free of gold, and

wherein additional layers of conductive metal on the refractory layer are not ~~necessary~~ in the ohmic contact.

35. (Original) The ohmic contact of claim 34 wherein said reactive layer further comprises from about 5 to about 45 atomic percent of an adhesive element.

36. (Currently Amended) A method for forming an ohmic contact on a compound semiconductor layer of a semiconductor device comprising:

~~(a)~~ depositing a reactive layer on at least a portion of a compound semiconductor layer of a semiconductor device, wherein the reactive layer is nickel and an adhesive element;

~~(b)~~ depositing a refractory layer on said reactive layer, said refractory layer is titanium, wherein said refractory layer is substantially free of gold, and

wherein additional layers of conductive metal are not deposited on the refractory layer in the forming of the ohmic contact.

37. (Original) The method according to claim 36 wherein said step of depositing a reactive layer comprises depositing a reactive layer on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, InAs, $In_xGa_{1-x}P$, InP, $In_xAl_{1-x}As$, InGaAsP, GaSb, or $In_xGa_{1-x}Sb$, all wherein $0<x<1$.

38. (Original) The method according to claim 36 wherein said step of depositing a reactive layer comprises depositing a reactive layer on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein $0.05<x<1.00$.

39. (Original) The method according to claim 36 wherein said step of depositing a reactive layer comprises depositing a reactive layer on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein $0.3<x<0.8$.

40. (Original) The method according to claim 36 wherein said step of depositing a reactive layer comprises depositing a reactive layer on at least a portion of a compound semiconductor layer that comprises $In_xGa_{1-x}As$, wherein x is approximately 0.6.

41. (Original) The method according to claim 36 wherein said step of depositing a reactive layer comprises depositing a reactive layer on at least a portion of a compound semiconductor layer that comprises InAs.

42. (Original) The method according to claim 37 wherein said step of depositing a reactive layer comprises depositing a reactive layer further comprising from about 5 to about 45 atomic percent of an adhesive element.

43. (Currently Amended) An ohmic contact to a compound semiconductor layer of a semiconductor device made by a method comprising:

~~(a)~~ depositing a reactive layer comprising at least one electrically conductive material on at least a portion of a compound semiconductor layer, wherein the at least one electrically conductive material is chosen from nickel, ruthenium, vanadium, gold, and cobalt; and

~~(b)~~ depositing a refractory layer comprising ~~electrically conductive material~~ titanium on the reactive layer, wherein said refractory layer is substantially free of gold, and

wherein additional layers of conductive metal are not deposited on the refractory layer in the forming of the ohmic contact.

44. (Currently Amended) An ohmic contact to a compound semiconductor layer of a semiconductor device made by a method comprising:

~~(a)~~ depositing a reactive layer on at least a portion of a compound semiconductor layer of a semiconductor device, wherein the reactive layer is nickel and an adhesive element;

~~(b)~~ depositing a refractory layer on said reactive layer, said refractory layer is titanium, wherein said refractory layer is substantially free of gold, and

wherein additional layers of conductive metal are not deposited on the refractory layer in the forming of the ohmic contact.

45. (Previously Amended) The ohmic contact of claim 21, wherein the ohmic contact can be used in at least one of a laser diode, a light emitting diode, a Schottky diode, a field effect transistor, a metal-semiconductor field effect transistor, a metal-oxide-semiconductor field effect transistor, and a high electron mobility transistor.

46. (Previously Amended) The ohmic contact of claim 34, wherein the ohmic contact can be used in at least one of a laser diode, a light emitting diode, a Schottky diode, a field effect transistor, a metal-semiconductor field effect transistor, a metal-oxide-semiconductor field effect transistor, and a high electron mobility transistor.

47. (Previously Amended) The ohmic contact of claim 43, wherein the semiconductor device comprises a laser diode, a light emitting diode, a Schottky diode, a field effect transistor, a metal-semiconductor field effect transistor, a metal-oxide-semiconductor field effect transistor, or a high electron mobility transistor.

48. (Previously Amended) The ohmic contact of claim 44, wherein the semiconductor device comprises a laser diode, a light emitting diode, a Schottky diode, a field effect transistor, a metal-semiconductor field effect transistor, a metal-oxide-semiconductor field effect transistor, or a high electron mobility transistor.

49. (Previously Added) The method of claim 1, further comprising:
depositing a dielectric layer onto the refractory layer.

50. (Previously Added) The method of claim 49, further comprising:
depositing a nitride liner onto a portion of the dielectric layer.

51. (Previously Added) The method of claim 50, further comprising:
depositing a spacer onto a portion of the nitride liner.

52. (Previously Added) The method of claim 36, further comprising:
depositing a dielectric layer onto the refractory layer.

53. (Previously Added) The method of claim 52, further comprising:
depositing a nitride liner onto a portion of the dielectric layer.

54. (Previously Added) The method of claim 53, further comprising:

depositing a spacer onto a portion of the nitride liner.

55. (Previously Added) The ohmic contact of claim 21, further comprising:

a dielectric layer disposed upon the refractory layer.

56. (Previously Added) The ohmic contact of claim 55, further comprising:

a nitride liner disposed onto a portion of the dielectric layer.

57. (Currently Amended) The ohmic contact of claim ~~36~~ 56, further comprising:

a spacer disposed onto a portion of the nitride liner.

58. (Previously Added) The ohmic contact of claim 57, further comprising:

a dielectric layer disposed upon the refractory layer.

59. (Previously Added) The ohmic contact of claim 58, further comprising;

a nitride liner disposed onto a portion of the dielectric layer.

60. (Previously Added) The ohmic contact of claim 56, further comprising:

a spacer disposed onto a portion of the nitride liner.

61. (Currently Amended) ~~The method of claim 1, further comprising:~~ A method for forming an ohmic contact on a semiconductor layer comprising:

depositing a reactive layer comprising at least one electrically conductive material on at least a portion of a compound semiconductor layer, wherein the at least one electrically conductive material is chosen from nickel, ruthenium, vanadium, gold, and cobalt; and

depositing a refractory layer comprising electrically conductive material on the reactive layer, wherein said refractory layer is substantially free of gold, and

depositing a low sheet resistance layer onto the refractory layer.

62. (Previously Added) The method of claim 36, further comprising:

depositing a low sheet resistance layer onto the refractory layer.

63. (Canceled)

64. (Previously Added) The ohmic contact of claim 36, further comprising:

a low sheet resistance layer disposed upon the refractory layer.

65. (Previously Amended) The method of claim 1, wherein the compound semiconductor layer is N+ InGaAs.

66. (Previously Amended) The method of claim 21, wherein the compound semiconductor layer is N+ InGaAs.

67. (Previously Amended) The method of claim 34, wherein the compound semiconductor layer is N+ InGaAs.

68. (Previously Amended) The method of claim 36, wherein the compound semiconductor layer is N+ InGaAs.